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AUTHOR Clark, Eve V.; Andersen, Elaine S.
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ABSTRACT

Children's self-monitoring of language production, as it is reflected in spontaneous speech repair, was studied. Recordings of the speech of three children aged two to three were analyzed for spontaneous phonological, morphological, lexical, and syntactic repairs. After tabulation, repairs were identified as "for the listener" (reflecting the child's need to make himself understood) or "for the system" (reflecting self-monitoring of those parts of the language that the child is in the process of acquiring). A similar analysis was made of the speech of several children aged four to seven, in a pretend play situation. Here it was found that monitoring and self-correction were aimed at the use of speech appropriate to the role being played. The overall conclusion of the study is that children monitor the gap between their knowledge of language from input received on the one hand, and their own language production on the other. This monitoring results in repairs which eventually close the gap. (JB)

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SPONTANEOUS REPAIRS: AWARENESS IN THE PROCESS OF ACQUIRING LANGUAGE*

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Eve V. Clark

Stanford University

and

Elaine S. Andersen

University of Southern California

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We wish to argue in this paper that children monitor what they say from the very early stages of language acquisition on. The evidence we shall rely on comes from the spontaneous repairs that children make to their own utterances as they talk. Repairs may be made spontaneously by the speaker himself following a mistake of some kind, or they can be elicited by another speaker showing signs of incomprehension or querying the first with interjected queries like huh? or what? What is crucial to our argument is that both types of repair require monitoring of what has just been said (a) in order to check whether any repair is needed, and (b) if it is, to know what has to be repaired. With spontaneous repairs, the speaker himself both detects the need for a repair and makes the repair with no prompting. With elicited repairs, another participant in the conversation detects the need for a repair and the speaker then checks back to see what could have required repair and repairs it. Here we will focus on young children's spontaneous repairs.

These repairs come from two sourses: first, longitudinal data on three children in natural conversation, and second, cross-sectional data from somewhat older children role-playing the voices for various puppets. We'll begin with a brief account of the longitudinal data which come from the following sources:

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*This paper is a preliminary report presented at the Symposium on Reflections on Metacognition at the Biennial Meeting of the Society for Research in Child Development, San Francisco, March 15-19, 1979. A more detailed account of our data and findings will be available soon (Clark & Andersen, in preparation).

This research was supported in part by the National Science Foundation (BNS 75-17126). We would like to thank M. Catherine O'Connor, Lizanne Ball, and Ruzica Kapetanovic for their invaluable assistance in collecting and transcribing the tapes on which this study is based, and the children we recorded for talking so much.

(a) Nine hours of recordings at two-weekly intervals from Sean, aged 2;2,16 to 2;11. This corpus of 30- and 60-minute tapes yielded 260 spontaneous repairs (an average rate of 27 per hour).

(b) Six hours of recording from Kate, aged from 2;8 to 3;0,5. These three-weekly to monthly recordings yielded 102 spontaneous repairs (an average of 17 per hour).

(c) Five and a quarter hours of recording from Zelda, aged from 2;11,20 to 3;7,14. These tapes yielded 115 spontaneous repairs (an average of 22 per hour).

There is one critical methodological observation we should make at this point about data on repairs. There is a problem in detecting repairs of the type we are interested in, whether in child or adult speech. The reason is this: As people listen to ongoing speech, they automatically edit out any mistakes they hear and thus neither notice nor remember mistakes or repairs made by the speaker. Detecting and transcribing repairs then may require going over each tape several times before one can get down all the small phonetic adjustments that go with repetitions, corrections of word choice, false starts, and so on. It is all too easy to stop once one has down what the child appeared to intend to say. Getting down everything may mean a transcription ratio as high as 20 hours to one hour of recording, particularly for the youngest children. The reason we stress this problem is that many records of young children's speech are unconsciously edited at the transcription stage.

We classified all the repairs taken from our longitudinal records into a number of different categories. For the present, we will group these under four main headings: phonological, morphological, lexical, and syntactic. The proportion of each type of repair in each child's speech is shown in Table 1.

Table 1

Percentage of Repairs in Each Major Category

by Child

	Total Number	Repairs			
Name	of Repairs	Phonol	Morphol	Lexical	Syntactic
Sean	260	43	19	35	11
Kate	102	12	23	69	26
Zelda	115	9	24	67	33

The proportion of phonological repairs decreases with age. The morphological repairs seem to remain fairly constant, and the lexical repairs--the corrections of word choice--increase with age, as do the syntactic repairs.

Although the comparisons given in Table 1 are fairly gross, with the total repairs for each child summed over the whole period of recording, there is a clear shift with age in the kinds of repair made most frequently. Sean,

the youngest (2;2 at the start of recording), produced many more phonological repairs and many fewer syntactic ones than the other two children. Both Kate and Zelda (first recorded at 2;8 and 2;11 respectively) produced many fewer phonological repairs and many more syntactic ones. Since all three children are in the age-range where most noun and verb inflections are acquired, it is probably not surprising that the incidence of morphological repairs is similar for all three. We will turn next to the kinds of repairs that fall under each of the major headings in Table 1.

Table 2 contains some typical examples of phonological repair. One frequently occurring type was the addition of a final consonant. In fact, out of 111 phonological repairs made by Sean, 65% fell into this category (see examples 1-4 in Table 2). A few repairs consisted of the addition not of a final consonant but of an initial or final syllable omitted in the first attempt at the utterance. Another type was correction of the vowel. However, both syllable addition and vowel adjustment were rare compared to final consonant additions (see examples 10-13). The only other types of phonological repair consisted of adjustments to the initial or medial consonants (see examples 8-9), but these too were rare.

Table 2

Typical Examples of Phonological Repairs

(a) Addition of Final Consonants:

1. S (2;3,21) Where's that anima--where's that animal who come [ə] out an' [ə] garbage?

2. S (2;4,25) Because it waa--because it want the purse.

3. S (2;4,25) [wə]--[wɔ]--where's a big ones?

4. S (2;5,14) Hair o--on your arms?

5. K (2;9,7) You sit down and watch this and [mei]--make song.

6. K (3;0,5) Dis is de kin' of milk--dis is de kind of milk I like.

7. Z (3;6) I better wor--I better work now.

(b) Adjustment of Medial Consonants:

8. S (2;3,21) I mood [ə]--I move it.

9. S (2;9,7) It's a [mʌn]--[mʌŋki].

(c) Adjustment of Vowels:

10. K (2;11) Hey, tickle my back, [mʌm]--[mɒmi] lion.

11. Z (3;1) They don't wear clothes to [bi]--to bed!

(d) Addition of Syllables:

12. K (2;11,21) Dat's a flower bas--basket.

13. Z (3;1) Yes, I'm a [mʌð]--I'm a mother.

Some typical morphological repairs are illustrated in Table 3. Among these there were a number of repairs to pronouns where the children corrected their choice of a possessive or nonpossessive form, e.g., I versus mine or my, or their choice of the appropriate person, e.g., I versus you. These repairs constituted some 24% of Sean's morphological repairs, 43% of Kate's and 59% of Zelda's. The other main categories of repairs for morphology consisted of the addition of the copula, correction of number agreement, and correction of pragmatic number, determined by reference. This category was particularly large for Zelda at 41%. Lastly, children repaired the tense and aspect inflections on the verb (see examples 6-7). This category was fairly large at 38% for Sean but negligible for the two older children who rarely made mistakes on either -ing, third person present singular -s, or the past tense -ed. The only other morphological repair was a pragmatically determined one and that was the choice of pronoun to fit gender (examples 3-4). For example, if a particular toy had been assigned a name of a specific gender, the children might start out by reference to it and then switch to he or she as appropriate.

Table 3

Some Typical Morphological Repairs

(a) Pronouns: gender

1. K (2;8,21) It's--it's--he's too big. (toy dog)

2. K (3;0,5) It's--he's finished his dinner. (another toy animal)

3. Z (3;2) ...but it--he climbs up--she climbs up in it. (owl named Sara)

4. Z (3;2) While I put it--her on.

(b) Pronouns: case

5. K (2;9,21) P'iceman, our car crashed into somebody's car an' us--and--an' we had problems. (role playing)

(c) Verb forms

6. Z (3;7,14) You know what they ate of, eat out of?

7. Z (3;7,14) She want--she wants to go to sleep.

In Table 4, we give examples of lexical repairs. The largest category for all three children is the substitution of a second (presumably better) word for the first word chosen. This accounts for over 67% of these repairs for all three children (see examples 1-6). (We included actual errors of reference in this category where the child misnamed something in context and then corrected that.) The remaining categories, small for all three children, consisted of the following: children would substitute a more specific word than the one originally produced, e.g., animal dog, shoe sandal. Or they might add some kind of qualifier. Instead of talking about the animals, they might talk about all the other animals or the big animals. Children would also fill in their pronouns occasionally with a full noun phrase so as to identify the referent more precisely, presumably for the sake of the listener. The incidence of this type of repair depends largely on the context and becomes more frequent when the referents of different hes are not clearly identified or pointed to in context (see examples 9-12 in Table 4).

Table 4

Some Typical Examples of Lexical Repairs

(a) Word choice

1. K (2;8,7) What--who's that?

2. K (2;9) You have to squeak--squeak--scrape it. (explaining how to work a sound-box)

3. K (2;9,7) You pick up--you take her. (family role-play; what to do with a child)

(b) Word choice + 'I mean'

4. K (2;9,21) And Jeffier's--I mean Antonia's blue. (talking about a bruised toe-nail)

5. K (3;0,5) Dey have little--I mean big turtle hands.

6. Z (2;11,20) Not the--I don't mean the new one. The old one.

(c) Addition of modifier

7. K (2;9) We are gonna see at the zoo big houses and scary--the spookiest spooky house.

8. Z (3;2) These animals are--all these animals are small.

(d) Filling-in proforms

9. K (2;9,21) It got--the wheel got out. (= came off)

10. K (2;11,21) No, dey cover of it--of de buttons.

11. K (3;0,5) He--um--has splinters in him--that animal.

12. Z (2;11,20) It's good that it, the page, doesn't get it on your fingers. (talking of a picture of a coal truck full of coal)

Table 5 gives some examples of syntactic repairs. The largest category for all three children is a switch in the choice of the subject. This comprises some 64% of Sean's syntactic repairs, and 82% and 84% respectively of Kate's and Zelda's. In most cases, this type of repair involved the child's starting out with one particular noun phrase, pausing, picking up a new noun phrase as the subject, producing the verb and then inserting the original subject as the object of the current utterance. These re-assignments of surface subject and object often appear to be the result of the children's trying to avoid passive constructions (see examples 1-3 in Table 5). Occasionally the original subject is embedded in a lower clause (see examples 4 and 8). The only other two categories that appear to be exploited among the syntactic repairs were the addition of a constituent or clause, used only rarely by all three children, and a few word order changes, mostly involving inversion or switches back to noninversion of the auxiliary and subject in yes-no questions (as in example 5). There were no examples of this in Kate's speech but Sean made several, and Zelda also produced a few.

Table 5

Some Typical Examples of Syntactic Repairs

1. K (2;8,7) The kitty cat is--de-de spider's kissing the kitty cat's back.

2. K (2;11) Dat's--he gave you dat meat.

3. K (2;11,14) She--he didn't give her any food. (he=turtle, she=kitten)

4. K (3;0,5) He went into--he put the fish into a flower pot. (picture in book)

5. Z (3;5) Is that your--that's your box?

6. Z (3;5) E: Do we have a dog?

   Z: We have--all these are our animals. (stuffed toys)

7. Z (3;6) Your, these are your pets....

8. Z (3;6) E: What do donkeys eat, Z? I don't know what to feed him.

   Z: Umm, they--my mommy said donkeys eat oats.

Repairs to the System and Repairs for the Listener

We can distinguish two major groups of repairs among the categories identified in these children's speech. Although the two sometimes overlap slightly, they can be characterized separately. First, there are repairs to the system. These repairs are not required for the listener to understand what the child is saying. Indeed, at an earlier stage, the listener has coped

quite easily with, say, an uninflected verb form or the absence of articles with nouns, and has not treated the child's utterances as therefore unintelligible. These repairs to the system, then, do not seem to be motivated by attempts to make oneself intelligible but rather seem to be repairs to those parts of the system where children notice that their own productions do not match their stored representations.

Our hypothesis therefore is that children monitor and check just those parts of the system they are in the process of acquiring. For instance, they should monitor past tense forms more closely when working explicitly on adding the appropriate past tense inflection to verbs. At that stage, they should pay particular attention to their stored representations of that part of the system--monitoring and checking their own usage. The incidence of repairs to any part of the system should therefore go up as children begin to show greater use of that part of the system. But once they have mastered a particular affix, the incidence of repair should drop to near zero since they will have little need to monitor so closely any more. Repairs to the system, then, should go hand-in-hand with growing mastery of the various elements in the system.

The other repairs we want to distinguish from these are repairs made for the listener. These repairs, we argue, are motivated by the need to make oneself understood. Repairs for the listener therefore include many types of phonological repair where it's important that the words used are recognizable. Interestingly, many words produced by children are quite recognizable even without final consonants. Yet the youngest child we recorded spent a great deal of time adding final consonants. Thus, although these repairs might be repairs for the listener par excellence, it's clear that they are also repairs to the system.

One domain where the repair seems not to be directed to the system but rather for the listener is where the child simply chooses the wrong word and then substitutes another for it. This includes the majority of the lexical repairs that were made by all three children. In a few cases, the children corrected their lexical choices quite explicitly by using such comments as I mean (examples 4-6, Table 4). These repairs seem to be directly geared at getting their intention conveyed accurately to the listener, and really do not involve the language system itself as such.

Another category of repair that seems to be aimed at the listener is where children "fill in" the pronouns they use. This morphological category, while not large, was employed by all three children. They would use a pronoun and then backtrack to fill it in with a more precise label for the entity being designated. Occasionally the proforms that got filled in were filled in where the child had also changed the syntactic construction being used and demoted the original subject to the object position in the repaired utterance (e.g., examples 4 and 8, Table 5). In these cases the child's filling in of the pronoun avoided having two he's in succession where the referents might have been hard to determine. Thus it is repairs dependent on context and aimed at the listener that constitute repairs for the listener. But as we noted earlier, they are not always clearly distinguishable from repairs to the system. Some repairs do both duties. They fill in details of the system and also aid the listener.

Repairs From Older Children

We would like to turn now to our other source of data. These come from recordings of older children who were role-playing and made repairs to the speech style or register they used as they did the voices for different puppets in the variety of settings. These repairs marked what the children judged to be speech appropriate to the particular role and addressee, for example that of a father talking to a young child or a nurse talking to a doctor. The data come from children aged between four and seven years who were role-playing by doing the voices for at least two puppets at once (Andersen, 1977). Their repairs were made to correct the kind of speech being used for a particular role.

Again we have picked out only the spontaneous repairs. Most of these repairs were phonological. Some typical examples are illustrated in Table 6. These repairs tended to come in clusters as though the child, in remembering which role it was that the voice should be marking, corrected not just one but several features of that register all at once. For instance, pitch was often adjusted in making phonological repairs, with high pitch used for child roles, versus lower pitch for adult roles, and very low pitch for male adult roles. When pitch was repaired, the intonation range used was often repaired at the same time. For instance, in adult roles the children were much more likely to employ an exaggerated pitch range contour when addressing a child than when addressing another adult (see example 5, Table 6).

Table 6

Some Typical Examples of Phonological Repairs in Role-Play

1. A.P. (4;10) as doctor to nurse, talking about putting medecine on the patient's arm: [starts with high voice] Let's see, which one--[shifts to low voice] which one is it?

2. D.P. (5;0) as mother to young child: [normal voice] Well I have--Well I--Well, si--[soft, sweet, high voice] Honey, I'm going [slows down] to go down to the basement and clean up the basement, [very softly] honey.

3. D.P. (5;0) as doctor to patient's mother: [high voice] Yes--[switches to lower, louder, ordering tone] but they'll have to stay in bed for a whole lot of--[pause, then normal pitch] years.

4. D.P. (5;0) as nurse to doctor: Doctor, you go ernza--examine 'em. I'll go examine the other one.

5. V.W. (5;6) as mother to young child: [slowly] Well, we are going to the--[switches to high voice with very exaggerated intonation] You don't even know! To the fair!

6. L.P. (6;7) as mother to father, in response to a comment from father: [loud, low voice] O--[switch to very high, softer voice] Okay, dear. [switch to normal voice] Let me--[higher voice] Lemma--[switch to higher, almost squeaky voice] Let, let me get breakfast for us.

7. A.B. (7;0) as foreign child to teacher: [starts in normal voice, quickly] Oh, I found a very, ver--[lower voice, slowly] Oh I found a very, very very pri'ee one.

8. A.B. (7;0) as child to mother: How about the three bears [switches to babyish voice, with high pitch and raised, somewhat rounded vowels] How about the three bears?

A second type of repair that was not as common but became more frequent in the speech of older children is illustrated in Table 7. These were lexical repairs, mainly repairs to the particular vocabulary judged appropriate to the particular role and to the topics that were being discussed as the children made up scenarios for the particular set of roles being played. For example, in the doctor-nurse-child scenario, there were repairs to the range of lexical items used and their appropriateness. In the family setting there were repairs to the lexical items for talking about particular actions or objects, e.g., kindergarten was substituted for nursery school and kick out for spank (see examples 1 and 8 in Table 7).

Table 7

Some Typical Examples of Lexical Repairs in Role-Play

1. A.D. (4;10) as older sister to mother, asking what to do with a note about younger sister's absence from school: Here, Mommy, where should I put this? Oh, I'll just bring it to her nurs--to her--kindergarten and tell--give it to the teacher.

2. D.P. (5;0) as doctor to child-patient: Well, I'll put you in the new bed that's clean, and it's--[higher voice, exaggerated intonation] a crib.

3. M.S. (5;3) as nurse to patient: Okay, I'll get the temperature thing. Here you go. Now open your mouth. It's about--three--de-grees. Well, you don't have bad--It's just two de--ger--ger--two grees.

4. L.P. (6;7) as doctor to father: So what you're gonna do is--you're gonna wait out in the--hall--in the waitingroom with your wife and....

5. L.P. (6;7) as father to young child: Well. Why don't I--why don't we lift you up and we'll go in the car.

6. A.B. (7;0) as grandmother to child: Hi--hello.

7. T.D. (7;1) as doctor to nurse, having been told that the patient is dead: Okay, take her to the gravestone--grave.

8. T.D. (7;1) as father to mother, after being asked 'What are you going to do today at the office?': I'm gonna go spank--I'm gonna go, uh, kick out my, uh, umm--se--

E: His secretary?

T.D.: Yeah. She's no good any more.

Lastly, there were some syntactic repairs in the children's choices of which form was most appropriate for the expression of a particular speech act. Some examples of this are illustrated in Table 8. For instance, the type of request made by a child to a father is corrected from an imperative form to a politer question form (example 3 in Table 8), as is an imperative addressed to a doctor by a nurse (example 4).

Table 8

Some Typical Examples of Syntactic Repairs in Role-Play

1. T.T.(6;11) as child talking to father, and father to child:

   Ch: Okay. Should I go to bwekfis now?
   Fa: Ask your mommy.
   Ch: Mommy, could I go--can I have breakfast now?

2. M.S. (5;2) as mother to daughter: Okay, daughter. I'll get--gimme--I'll get some money.

3. M.R. (5;3) as child to father: Daddy, take--could you please take me to school?

4. L.P. (6;7) as nurse to doctor: Look--Would you like to look at the X-rays, doctor?

These repairs from older children represent another dimension of children's growing knowledge about how to use language. Here, they are monitoring for the particular speech appropriate to different roles in the scenarios they are playing. Normally, speakers need only be concerned with what is appropriate for their own speech in particular contexts with various interlocutors, as was probably true for most of the recordings we made of the three younger children. However, even there Kate on several occasions at least, did some role playing and made adjustments in her speech to different interlocutors to fit the fantasy context. With older children, we are tapping both their knowledge of appropriate speech and their knowledge of which kinds of devices can be used to differentiate particular roles in context.

The first choices that they seem to rely on to differentiate roles are phonological ones. Their focus initially seems to be on the relative pitch of the voice and the kinds of intonation pattern used. These can signal speech for different roles (child, father, mother; doctor, nurse) and directed at different addressees (to child, to adult, to male, to female) very effectively, and are the first differentiating features that are grasped in role-playing. As children get older and learn more about the lexicon and the vocabulary specific to different domains, they start to make lexical repairs in their choices of words appropriate to the roles and topics that they set up for discussion in these roles. Again, these repairs appear to reflect their growing knowledge of how the language is used in a range of different settings to different addressees. Finally, the syntactic repairs they make are repairs of the forms appropriate to express particular speech acts. These repairs require that the children already have mastery of the range of forms

being used so they are in fact repairing their choice of form rather than trying to repair a particular form itself.

If social knowledge is part of what we all know implicitly about language use, then these role-playing repairs are both repairs to the system and repairs for the listener. They fall into both categories because the children are playing contrasting roles that have to be kept apart. Children do this by distinguishing the voices, choosing vocabulary appropriate to each role and setting, and selecting appropriate forms of expression for the interlocuters to use to different addressees in each role. The range of options that children expoit and hence repair enlarges as they get older. The younger children in the role-play setting focus primarily on phonological details to differentiate roles and their repairs are mainly phonological. Slightly older children start adding lexical and syntactic devices too, and their repairs include those in addition to the phonological clusters common in the younger children's repairs.

Conclusion

In conclusion we suggest first that the repairs children make change with age and level of language development. As children acquire more of the system, they mainly repair just those elements they are currently working on. Second, the fact that children make spontaneous repairs at a very early age suggests that their representations of the forms and functions of language are probably ahead of their productive capacity. This does not necessarily mean that their representations of these forms and functions are necessarily equivalent to the adult's. But there is a gap between what children know about language from the input they receive and what their own production of language is like. It is this gap that they monitor; when they notice the gap for that part of the system currently being acquired, children make repairs. The argument that we're making here is similar to one that has been made about phonological development, namely that the child's representation of what a word sounds like may be detectably different from his own production of that word. The child's aim is to narrow the gap between representation and production until he no longer detects mismatches (Clark & Clark, 1977). This process, we suggest, motivates children's continuing acquisition of the language system even when they already communicate effectively.

Third, the fact that children make spontaneous repairs is, we argue, strong evidence they are aware of language, its forms and functions, throughout the acquisition process. This view runs counter to the theory held either implicitly or explicitly that metalinguistic knowledge develops only after children have acquired the basics of their language. In part we think that previous investigators have come to that conclusion largely because of the kinds of tasks they have relied on as evidence that children can reflect on language in some way. Children are asked, for instance, to make judgments of relative grammaticality. However, no one to our knowledge has considered the role of children's spontaneous repairs and what these say about awareness (see Clark, 1978). We suggest that the awareness of language revealed by spontaneous repairs may play an essential role in the process of acquisition itself. Without the ability to monitor, check, and then repair one's utterances, it is unclear how children go about changing a rudimentary system

into a more elaborate one. The mechanism of monitoring and checking seems to offer just the kind of mechanism that may be needed for the acquisition of such a complex skill as language.

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